

Innovative Prosthodontic Approach for Treating Hypodontia: A Case Report

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Received date: 15 September 2023; **Accepted date:** 28 September 2023; **Published date:** 31 October 2023

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Citation: Mohammed Riyadh Ali Hammamy, Lana Mones Gharaibeh, Aseel Abdulameer Radhi. Innovative Prosthodontic Approach for Treating Hypodontia: A Case Report. Journal of Dentistry and Oral Health 1(1). <https://doi.org/10.61615/JDOH/2023/OCT027142801>

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Abstract:

Young patients with hypodontia and skeletal Class III relation represent esthetic and psychological problems that require special attention. This includes surgical correction, which is unpredictable and increases the suffering of the patient. This case report describes a novel treatment plan for hypodontia with skeletal class III patients depending solely on prosthetic correction, avoiding surgical intervention.

Keywords: hypodontia, skeletal class III, dental prosthesis design

Introduction:

It is uncommon to encounter young patients with hypodontia or anodontia in prosthodontics clinics. Some authors reported that a tendency towards a class III skeletal pattern increases with the severity of the hypodontia. [1] Balancing the occlusion relationship while enhancing the patient's facial aesthetics presented a significant challenge, [2] particularly when there was a reduction in upper lip protrusion. [3] The treatment approach for such cases differs for each individual. If sufficient teeth are present, fixed bridges can be considered; additionally, removable dentures can be a great approach as well, [4] as removable prostheses are a more predictable replacement for the missing hard and soft tissues. [5] Overlay dentures, also known as telescopic overdentures, represent a valuable variant of removable dentures. They are considered a superior alternative to traditional complete dentures, primarily due to their superior retention and stability. These dentures enhance chewing efficiency, elevate patient comfort, and contribute to a reduction in alveolar bone resorption. [6] The evolution of removable dentures encompasses not

only variations in their designs and applications but also diversity in the materials used for their construction. A great example is the innovation of polyamide removable partial dentures, also known as flexible dentures. [7] Flexible dentures offer distinct advantages by delivering superior outcomes, particularly in cases featuring bilateral undercuts, all while prioritizing aesthetics. [8] Flexible, removable partial dentures have gained significant popularity, surpassing that of acrylic removable dentures. When patients were asked about their preference between the two types, the majority favored the flexible option.

[9] The primary objective of prosthetic treatment in such cases is to restore both function and aesthetics while preserving the existing teeth and promoting emotional and psychological well-being. [10] Most importantly, this approach aims to achieve these objectives without resorting to extensive surgical procedures.

Case Report:

History: A 16-year-old female patient, previously treated with maxillary orthognathic surgery as illustrated in [Figure 1], was referred by the maxillofacial surgeon to

The prosthodontic clinic. She presented with eating challenges and compromised esthetics resulting from the loss of abnormally developed teeth.

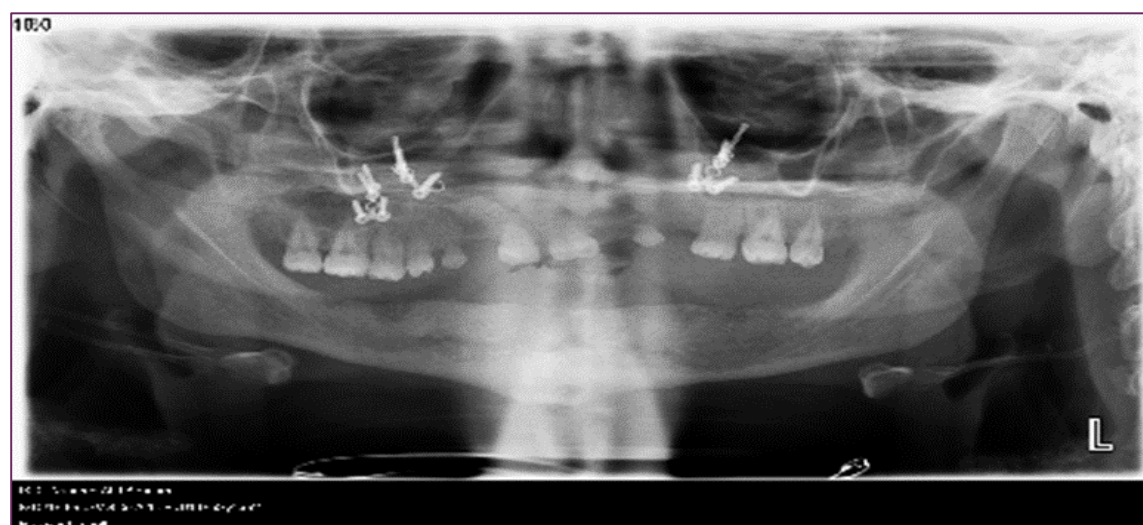


Figure 1: Image of Orthopantomogram (OPG) of the patient.

Extra oral examination: The frontal view revealed an asymmetrical face with a depressed upper lip [Figure 2].



Figure 2: Frontal view of the patient

Intraoral examination:

There was a tendency to class III maxillary–mandibular relation. The conditions of the remaining teeth in the upper jaw demonstrated a grade II mobility, specifically for the two upper primary centrals and the two upper primary canines. The radiograph revealed no bone support around those four primary teeth. The molars that remained exhibited a conical crown shape and displayed grade I mobility, as seen in [Figure 1].

Treatment Plan:

1. The hopeless teeth were extracted, which included the two upper primary incisors and the two upper primary canines.
2. Efforts to conserve the remaining teeth focused on crowning the upper molars with metal crowns. This involved adjusting the contact area between the last two upper right molars without any further preparation. The crowns, seen in [Figure 3], had a non-anatomical, tapered design with feather-edge finishing lines. After the crowning procedure, the teeth were stabilized, and their mobility ceased.



Figure 3: Images of the upper arch before and after cast metal crown placement

- 3 Upper and lower complete denture fabrication. Initiated by taking an alginate primary impression. Then, take a final impression of the upper arch with heavy and light body silicon. For the lower arch, a special tray was constructed with cold cure acrylic resin, then border molding was made along with tracing compound, and lastly, a final impression was

taken with zinc oxide eugenol material. Final impressions were poured with stone to create the master casts.

- 4 The upper cast was mounted on the upper member of the semi-adjustable articulator using a face-bow record as in [Figures 4 A and B], followed by the recording of the vertical and centric relation. These records were transferred to the articular [Figure 4C].



Figure 4: Images for jaw relation record A- Face bow record, B- Mounting the upper cast according to face bow record, C- Mounting the master casts on semi-adjustable.

5 Recording the vertical dimension and centric relation posed a challenge, primarily attributed to the skeletal Class III relation evident in [Figure 4C]. To address this issue, an approach involving the use of biting wax was employed, aiming to elevate the vertical dimension and retrude the

mandible. In this process, the rest of the vertical dimension was adjusted to match the vertical dimension in occlusion. Additionally, the thickness of the upper bite wax rim was increased to rectify the appearance of the upper lip, as seen in [Figures 5A and 5B].



Figure 5: Images of patient profile **A-** before vertical dimension correction **B-** after vertical dimension correction

6 Both upper and lower wax dentures were inserted into the patient's mouth to validate centric and vertical relationships, as well as assess aesthetics. The positioning of the anterior teeth was meticulously adjusted, one tooth

at a time, and assessed within the patient's oral cavity to establish a midline that would yield an aesthetically pleasing outcome, taking into account facial asymmetry, as illustrated in [Figure 6].



Figure 6: Images of the try-in procedure

7 During the final visit, the insertion phase took place. The upper denture, crafted from flexible polyamide acrylic resin (Lingchin, China), is designed to fit over the cast metal crown, functioning like an over-denture, as seen in [Figures 7A and 7B]. Conversely, the lower denture

is constructed using heat-cure acrylic resin (Pyrax, India), following the traditional complete denture approach, as illustrated in [Figure 7C]. After insertion, the patient received oral hygiene instructions.



Figure 7: Images of insertion procedure **A-** occlusal view of a flexible upper denture, **B-**flexible upper denture fit over metal crowns, **C-** frontal view for the patient with final dentures in a month.

Discussion:

It was decided that the option of correcting the maxillary-mandibular malocclusion through additional surgery is contraindicated due to the patient's prior surgical experience. The treatment plan involving the extraction of remaining teeth followed by the placement of fixed bridges over implants for both arches was also dismissed as it was costly and entailed an extended treatment duration. Consequently, the choice of a removable denture was determined to be the most suitable treatment for this case, given its cost-effectiveness, feasibility, and the fact that it represented the least invasive procedure.

Following the removal of teeth that are non-restorable, the intention was to retain the posterior teeth to prevent alveolar bone resorption. [12] Furthermore, these posterior teeth could serve the dual purpose of anchoring the upper complete denture for improved retention and facilitating a more comfortable prosthesis design characterized by a horseshoe configuration instead of palatal coverage. [6]

The posterior teeth were saved by crowning. The root/crown ratio was 1, which proved to be the minimal ratio that is clinically feasible, as seen on the OPG radiograph. [13] It was noted clinically that these remaining teeth had slight mobility, which was solved after crowning those teeth. This could be attributed to the metal crowns establishing substantial contact with one another, effectively serving as splints for fragile, small teeth, as noted by Lindha in 2008. [14] The crowned primary teeth were not prepared, as they demonstrated tapered shapes and very short clinical crowns. These teeth were treated like primary teeth, as documented by Duggal et al in 2005. [15] The main objective of crowing was to increase the size of the teeth and make them a viable option for prosthesis support.

The correction of the maxillo-mandibular relationship was achieved through an increase in the vertical dimension of occlusion, resulting in the mandible moving downward and backward along the arc of the opening and closing path while the condyles remained in a centric relation. This approach facilitated the alignment of anterior teeth into a typical class I maxillo-mandibular relationship, significantly enhancing aesthetics. Furthermore, it gained support from various authors who have found that increasing the vertical dimension of occlusion is generally safe, provided it does not compromise the temporomandibular joint [16].

The flexible overdenture enhances retention by utilizing the undercut regions of the tapered, non-anatomical metal crowns, contacting a smaller surface area compared to conventional dentures. Additionally, it streamlines the process, eliminating the necessity for oral preparations typically required in the creation of cast partial dentures [9].

Conclusion:

Prosthetic approaches offer a less invasive treatment option that is both time-efficient and capable of delivering favorable aesthetic outcomes for certain hypodontia cases associated with jaw malocclusion, all while avoiding the need for extensive surgical procedures and their associated risks.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

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